

Carbon dioxide levels threaten prairie life

Problem could end up costing ranchers, as well

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Rising carbon dioxide levels could mean higher feed costs for ranchers and fewer wild ruminants such as antelope and deer, suggest studies by a U.S. Department of Agriculture research team in Fort Collins.

The team, from the USDA's Agricultural Research Service, is close to launching a second experiment near Cheyenne, Wyo., to study carbon dioxide increases on rangelands. The first, a five-year study done east of Fort Collins near the Pawnee National Grassland, showed that heightened carbon dioxide levels stimulated plant growth but diluted

nitrogen in the thicker foliage.

A byproduct of fossil fuels, carbon dioxide concentrations have increased from 280 parts per million since the beginning of the Industrial Revolution to about 370 parts per million now. That number is projected by some scientists to exceed 600 parts per million by the end of the century.

"This has huge implications for grasslands all around the world," said Jack Morgan, a research leader and plant physiologist with the Agricultural Research Service in Fort Collins.

For ranchers, diluted nitrogen would mean lower-quality forage for livestock and more reliance on feed supplements like hay and alfalfa. But the issue, which could take decades to develop, isn't on the radar of most ranchers.

Poor forage quality could lead to impacts similar to those that ranchers faced during the drought, when some sold off their herds or turned to hay as pastures deteriorated.

Microbes in cattle and other ruminants break down nitrogen to make protein.

Ken and Edie Yates, who for 15 years have owned Park Creek Cattle, raise steers during the summer on their 510-acre spread near Buckeye, north of Fort Collins. The steers are fed only by native pasture land, a regime that could change if carbon dioxide levels climb.

"In drought years ... a couple years we didn't graze at all," Edie Yates said.

Supplementing grazing with hay or other feeds would cut already-slim profit margins for ranchers, she said.

"Whatever profit you're talking about is going to go down."

In the five-year study near the Pawnee grasslands, which doubled carbon dioxide to 720 parts per million in three glass chambers on the prairie, poorer-quality grasses, including so-called needle-

and-thread species, thrived.

So did weeds, which could force aggressive treatment by rangeland managers in the future, including deliberate planting of carbon-dioxide-loving legumes on the prairie.

Based on other studies, elevated carbon dioxide could increase disease in grasses and give invasive species a "leg up," said Dana Blumenthal, a weed ecologist with the Agricultural Research Service.

The team's second study will spray carbon dioxide on open-air plots of prairie west of Cheyenne to monitor effects on a broader scale than the chamber work. They'll test the method this summer and officially begin the study in 2006.

Degraded forage and diluted nitrogen in rangeland plants could ultimately kill or force migration of deer and pronghorn antelope. Several winters of poor forage, coupled with a decline in nutrition of summer feed would leave an animal unable to eat enough to get required nutrients.

"In a bad winter, you could die with a full stomach," said Dan Milchunas, a research scientist in the College of Natural Resources at Colorado State University.

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